

(No Model.)

2 Sheets—Sheet 1.

W. B. PURVIS.
PAPER BAG MACHINE.

No. 578,361.

Patented Mar. 9, 1897.

Fig. 5.

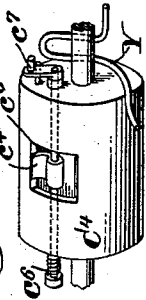


Fig. 2.

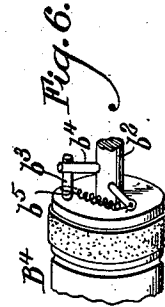
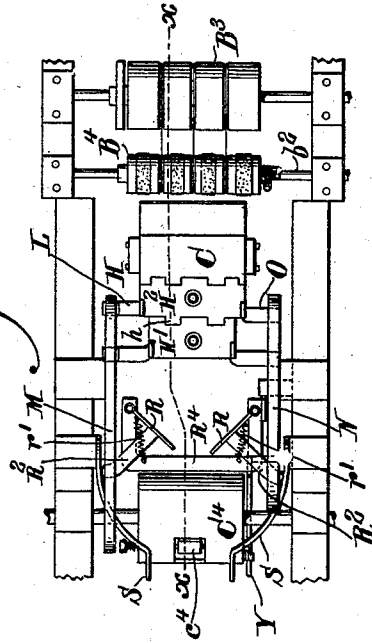
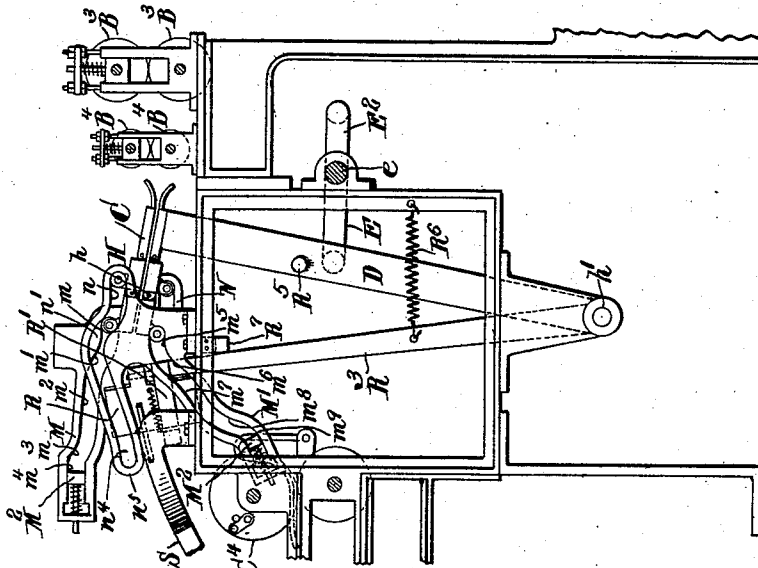


Fig. 1.



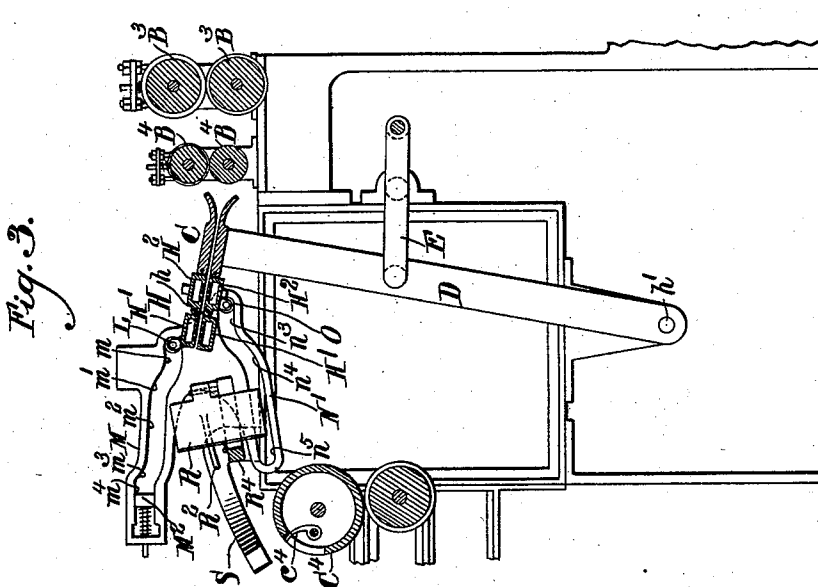
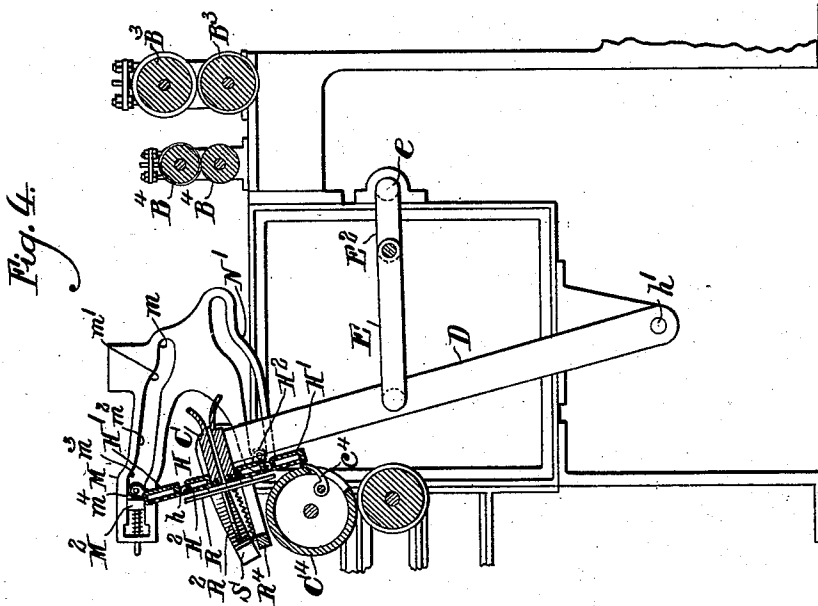
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2 Sheets—Sheet 2.

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PAPER BAG MACHINE.

No. 578,361.

Patented Mar. 9, 1897.



Witnesses.

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 R. M. Kelly.

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UNITED STATES PATENT OFFICE.

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PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 578,361, dated March 9, 1897.

Application filed May 14, 1896. Serial No. 591,506. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. PURVIS, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Paper-Bag Machines, of which the following is a specification.

My invention relates to paper-bag machines; and it consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings.

My invention relates more particularly to paper-bag machines of the character shown in Letters Patent to myself, Nos. 519,348 and 519,349, dated May 8, 1894, and No. 530,650, dated December 11, 1894, in which the end of a bellows side-fold tube-section is bent into the proper creases or folds to form the bag-bottom by means of movable suction-formers composed of sections which are caused to move apart and to vary their angular relations.

My present improvements relate to the devices for imparting the desired movements to the sections of the movable suction-formers, to the auxiliary folding devices acting in conjunction with the movable suction-formers to assist in the formation of the folds of the bag-bottom, to the stripping devices for removing the tube-sections from the bottom-formers and delivering them to the final folding and pasting devices, and to the feeding devices for feeding the tube-sections to the suction-formers.

My improvements are designed to increase the speed and capacity of production of the machine, to improve the operation of the forming devices in making the desired creases or folds, and to prevent wrinkling and tearing of the paper.

In the drawings, Figure 1 is a side elevation of a portion of a paper-bag machine illustrating my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal vertical sectional view on the line *xx* of Fig. 1. Fig. 4 is a view similar to Fig. 3, showing the movable parts in a different position. Fig. 5 is a perspective view of the detached stripping-roller, and Fig. 6 is a perspective view of one end of the folding-wings and part of the upper-tube-feeding roller.

The machine shown is similar in general

character and construction to the machine illustrated in Letters Patent to myself, Nos. 519,348, 519,349, and 530,650, before referred to, and reference may be had to the said Letters Patent for greater particularity with reference thereto. I have shown in the drawings only so much of the machine as is necessary to enable the present improvements to be understood.

H are the suction-formers, each composed of two hollow sections $H^1 H^2$, hinged together at *h* and provided with perforated faces.

C is the reciprocating carrier or frame by which the suction-formers H are carried, and D is the rocking-lever which carries the reciprocating carrier C and is pivoted to the main frame, as at *h'*. The lever D is shown operated by a crank E^2 on the shaft *e*, through a link E.

$B^3 B^3$ are the stripping-rollers which take the tube-sections from the cutters (not shown) of the tube-forming devices, and $B^4 B^4$ are the feed-rollers which take the tube-sections from the rollers $B^3 B^3$ and feed them to the suction-formers H H.

C^4 is the stripping-roller of the final folding and pasting devices which take the sections from the formers H H.

In the machine shown in the patents referred to the sections $H^1 H^2$ of the suction-formers H H are caused to open up or move apart during their forward reciprocation, so as to first move slightly apart, then into a position with the outer sections $H^1 H^1$ parallel and substantially horizontal and the inner sections $H^2 H^2$ at an inclination next into a position with the inner sections $H^2 H^2$ vertical and the outer sections $H^1 H^1$ horizontal, so that the two sections of each former are substantially at right angles, and finally in a position with both the outer and inner sections in a substantially vertical position, as shown in Fig. 4. During these movements the faces of the end of the bellows side-fold tube are first drawn slightly apart, then into the square or box-shaped position, and finally into the flattened position, as is fully described in the aforesaid Letters Patent. These movements are imparted to the sections $H^1 H^2$ of the formers H by means of suitably arranged cams, one for each section, against the faces

of which arms on the sections are held in contact by springs.

To impart more perfect, quicker, and more positive movements to the sections H' H² of the formers H, I employ instead of the cams and springs described in the patents referred to slotted or grooved cams of peculiar shape, which receive fingers or projections carried by the sections of the formers. These slotted or grooved cams are more particularly shown in Figs. 1, 3, and 4, in which M M' are the cams for the upper and lower outer sections H', respectively, and N N' the cams for the upper and lower inner sections H², respectively.

The cams M M' are shown disposed on opposite sides of the machine and are each provided with cam slots or grooves of substantially the shape shown. The slot of the cam M for the upper section H' commences with a very slightly upwardly-inclining portion *m*, followed by a short quick upward incline *m'*, leading to a longer slightly-inclining portion *m²*, followed by a second short quick incline *m³*, and terminating in an approximately horizontal portion *m⁴*. The slot of the cam M' for the lower section H' commences with a short slightly downwardly-inclining portion *m⁵*, followed by a short quick downward bend *m⁶*, leading to a longer downwardly-inclining portion *m⁷*, followed by a quick downward bend *m⁸*, and terminating in a slightly-inclining portion *m⁹*. The two cam-slots are thus provided with oppositely-located quick bends *m'* and *m⁶* and *m⁴* and *m⁸*, the effect of which is to impart to the sections H' H' as they move apart a slight springing or quick movement at the two instants in their operation when these portions of the slots are reached by the roller projections L of the sections. This quick movement greatly assists in breaking down the paper of the tube-section into the proper folds.

The cams N N' for the inner or rear sections H² H² are disposed above and below the line of movement in the carrier C and are provided with cam slots or grooves of substantially the shape shown. The slot of the upper cam N commences with a short approximately horizontal portion *n*, followed by a sudden upward bend *n'*, and terminates in a long downwardly-inclining portion *n²*. The slot of the lower cam N' commences with a short horizontal portion *n³*, followed by a sudden downward bend *n⁴*, and terminates in a long downwardly-inclining portion *n⁵*. The effect of the sudden bends *n'* and *n⁴* is to impart a quick or springing movement to the sections H² H² in throwing them from the partially-opened into the fully-opened position, thus aiding greatly in breaking down the paper of the tube into the square box shape. The outer sections H' H' are each provided with a projection or finger L, extending into the slots of the cams M M', and these fingers or projections are preferably provided with rollers, as shown. The rear sections H² H²

are similarly provided with roller fingers or projections O, extending into the slots of the cams N N'.

A pair of upper and lower cams is disposed in each side of the machine, and I prefer to construct each pair of cams of single plate secured to the side of the machine. I have shown the cams M and N' in a single plate secured to one side of the machine and the cams M' and N in a similar plate on the opposite side of the machine. The slots of the cams M M' may each be provided with spring-buffers M², as shown, to receive the roller-arms L L and thus relieve the formers of jar and strain at the end of their forward movements.

In Figs. 1 and 3 the formers are shown in the position occupied by them before the commencement of a forward reciprocation, and in Fig. 4 they are shown at the end of their forward movement.

As the carriers C C move forward the fingers O of the rear sections H² move in the slots *n n³* of the cams N N', and thus the rear sections H² H² are moved apart. At the same time the portions *m m³* of the cams M M' move the outer sections H' H' slightly apart. When the fingers L of the sections H' reach the short inclines *m m⁶*, they are moved quickly outward and thus draw the sections H' H' farther apart with a quick action. The fingers L then pass through the portions *m² m⁷* of the cams M M' and thus cause the two sections H' H' to move for a short distance parallel to one another. Meanwhile the fingers O in the rear sections H² H² have moved through the bends *n' n⁴* in the cams N N' and have drawn the sections H² H² into a straight line with one another, and they remain in this position while the fingers O pass through the slots *n² n⁵*. When the fingers L reach the inclines *m³ m⁹*, they are moved quickly upward, throwing the sections H' H' outward to their full extent, so that they are in line with the sections H² H², and they remain in this position while the fingers L are moving through the portions *m⁴ m⁹*. These movements imparted to the sections of the suction-formers cause the paper of the bag-section which adheres to the perforated suction-faces to be broken into the proper creases and folds, as described in the Letters Patent before referred to.

When the bag-bottom has been folded and the formers H have reached the limit of their forward movements, the tube-section is stripped off by the stripping-cylinder C⁴ and passes to the final folding devices. The formers H H then move back and are closed by the action of the cams M M' and N N'. The slotted cams permit rapid movement and insure positive, steady, and quick action on both the forward and backward movements.

It will be understood that suitable devices for automatically clamping and unclamping the bag-section in the carrier C will be employed, such, *e. g.*, as are shown in Patent No. 530,650, referred to, and that auxiliary fold-

ing-fingers to assist the suction-formers in the formation of the diamond side folds, such as are shown in Patent No. 519,349, may be employed.

5 For the purpose of stripping the tube-section from the formers and insuring its removal without tearing or wrinkling of the paper I employ a cam-actuated gripping-jaw c^4 upon the stripping-roller C^4 . As shown, 10 this jaw is carried by a rock-shaft c^5 , journaled in the roller C^4 , and projects through an opening therein. The rock-shaft is held in a normal position with the jaw c^4 open by a spring c^6 , and is provided with an arm or 15 projection C^7 , which is actuated by a stationary cam Y to rock the shaft c^5 and close the jaw c^4 . This cam is so disposed that it will act upon the projection c^7 and close the jaw c^4 with a positive gradual motion and not with a 20 sudden snap, which is liable to tear or wrinkle the paper. The cam Y holds the jaw c^4 closed until the tube-section is stripped from the formers. It then releases it and the tube passes to the final folding and pasting devices. (Not shown.)

To assist in the flattening down of the two side folds when the ends of the paper tube-section are drawn out by the final outward movement of the sections $H' H'$, folding-wings 30 $R R$ are employed. In the Patents Nos. 519,348, 519,349, and 530,650 these folding-wings are shown carried by the reciprocating carrier C , one on each side, and moving therewith. They are closed down upon the open 35 faces of the formers by cam-pieces S , located in the front of the machine. A part of the present invention relates to improvements in the arrangement and operation of these folding-wings, whereby greater speed and efficiency are obtained.

40 R^3 is a rocking frame or lever suitably fulcrumed, as at b , in the frame of the machine and provided at its upper end with a frame R^4 , occupying a position in front of the suction-formers H . The wings $R R$ are hinged, 45 as at r , to arms of the frame R^4 , and are connected with the frame by springs r' , which act to normally throw the wings outward, as in Fig. 2. The cams $S S$ are located, one on 50 each side, in front of the wings $R R$, and the latter are provided with fingers R^2 , making contact with the cams S .

In Figs. 1 and 2 the frame R^4 and wings R are shown in the position normally occupied 55 by them.

When the formers H have been moved forward and have reached that portion of their movement when the sections $H' H'$ are opening out, the frame R^3 is moved forward and 60 the cam-pieces R^2 are pressed against the cams S , so that the wings $R R$ are closed down upon the faces of the opening formers, as is shown in Figs. 3 and 4.

The movement may be imparted to the rocking frame R^3 in any suitable manner. As a 65 convenient means of operating it I have shown the rocking-lever D provided with a

projection R^5 , adapted to act upon the frame R^3 and rock it as the lever D moves forward. A spring R^6 between the lever R^3 and the main 70 frame returns the lever R^3 to normal position. The backward movement of the lever R^3 is limited by a stop R^7 . When the formers H move back, they move away from the wings $R R$, and their closing action is in no way im- 75 peded by the presence of the wings $R R$, as is the case when the wings are carried by the carriers C . It is also objectionable to carry the wings R by the carrier because of the increased friction and the liability of the wings 80 to become loosened and get out of order when the carriers reciprocate at a high rate of speed.

By arranging the wings R on a separate 85 frame the full action of the wings is obtained with a very slight movement of the frame which carries them, and the speed of the reciprocating carriers and the consequent productive capacity of the machine is greatly in- 90 creased.

To avoid the liability of the tube-sections becoming torn or wrinkled when they are fed 95 from the rollers $B^4 B^4$ to the formers $H H$, which may occur if the feeding-rollers $B^4 B^4$ exert any material friction or any backward pull upon the tube-sections when they are 100 gripped and carried forward by the carriers C , I make one of the rollers B^4 yielding upon its shaft, so that it will "give" or yield to the pull exerted by the carriers upon the paper.

In the drawings I have shown the upper 105 roller B^4 mounted loosely on its shaft b^2 , by which it is driven through a pin or lug b^3 , engaging a projection b^4 on the shaft b^2 . A spring b^5 between the roller and the shaft 110 holds the lug b^3 normally in contact with the projection b^4 . As the shaft b^2 rotates, it drives the roller through the pin b^4 and lug b^3 ; but if an excessive forward pull is exerted upon the roller B^4 it will move forward upon its 115 shaft b^2 , thus relieving the tension on the tube-section.

Details of construction may be varied without departing from the invention.

What I claim as new, and desire to secure 115 by Letters Patent, is—

1. In a paper-bag machine, the combination with moving sectional suction-formers by which the paper tube-section is carried, of stationary slotted or grooved cams for the sections of the formers, and guide projections carried by the former-sections and extending into 120 the cam grooves or slots, whereby the suction-formers are caused to move apart and vary their angular relations when operated.

2. In a paper-bag machine, the combination with the moving suction-formers, and cam devices for moving them apart when they are operated, of an independent movable frame 125 located in front of the moving suction-formers, folding-wings carried by the movable frame and adapted to fold down upon the opened suction-formers when the movable frame is moved forward, and means to move 130

said movable frame forward at a certain period in the forward movement of the suction-formers.

3. In a paper-bag machine, the combination with moving suction-formers and cam devices for moving them apart when they are operated, of an independently-movable frame arranged in front of the moving suction-formers, folding-wings R, R, carried by the movable frame, stationary cams S, S, arranged in front of the folding-wings R, R, and adapted to close them when the frame which carries them is moved forward, and devices to move the said frame forward at a certain period in the forward movement of the suction-formers.

4. In a paper-bag machine, the combination with the movable suction-formers, devices to open up said suction-formers when they are moved forward, power devices for moving said formers, a movable frame located in front of the suction-formers and arranged in the path of the devices for moving the formers so as to be actuated by said devices at a certain moment in the movement

thereof, and folding-wings R, R, carried by the movable frame and adapted to be closed upon the opened faces of the suction-formers when the frame which carries them is moved forward.

5. In a paper-bag machine, the combination with the movable sectional suction-formers, the cam devices for moving the suction-formers apart and the rocking-lever D for reciprocating the formers, of the rocking frame R⁴ located in front of the lever D and adapted to be rocked thereby at a certain period in its movement, the spring folding-wings R, R, carried by the frame R⁴ and the cams S, S in front of the wings R, R, adapted to act thereon and close the wings when the frame R⁴ is rocked.

In testimony of which invention I hereunto set my hand.

WILLIAM B. PURVIS.

Witnesses:

ERNEST HOWARD HUNTER,
R. M. KELLY.